



Traffic Safety Study

Problem Statement: 200+ traffic cameras deployed throughout the city provide access to a wealth of data that could be used to give us a deeper understand of the conditions that lead to traffic accidents. Due to limited human resources, this video feed data is often underutilized, and usually only used to verify concerns identified by other means. Meanwhile, alternative approaches are used to collect the same data in these video feeds by other means (e.g. annual vehicle counts). These approaches are costly and provide only a small snapshot in time, compared to the continual data available from these camera feeds.

Hypothesis: We believe AI on city traffic camera feeds will 1) provide the City and key stakeholders a better understanding of the issues that lead to traffic accidents; 2) empower stakeholders to plan smarter, safer streets and pedestrian features; and 3) provide sufficient data to replace existing stand-alone roadway data collection efforts to save taxpayer dollars.

Objective: Establish a pilot zone to apply artificial intelligence (AI) to traffic camera feeds, using SwRI's ActiveVision system, to extract data from a subset of traffic camera video feeds. Extract vehicle and pedestrian traffic patterns across extended periods of time to build better solutions to address accidents and fatalities.

Research Questions:

Phase 0	(SwRI Internally Funded) Currently being developed with City's needs in mind; expected availability early 2020.
Phase 1*	Identify small subset of traffic cameras throughout the City with placement conducive to collecting the highest priority data for TCI and pilot the system on these cameras. Deploy the beta system here and iteratively enhance.
Phase 2	Expand initial deployment to broader range of cameras across the city.
Phase 3	Can we utilize the data reported to drive day-to-day operations?
Phase 4	Can we identify patterns in the data archived across a longer period to identify infrastructure needs not evident through more standard approaches?
Phase 5	Can we apply lessons learned from the initial pilot to address other issues proactively/strategically?

Approach:

- 1) Prototype/Technology: (SwRI Internally Funded) Build beta ActiveVision to extract actionable data from City traffic cameras
- 2) Experiment/Application: Pilot ActiveVision on small subset of City cameras, measuring effectiveness/reliability of the system
- 3) Report: Document wins, barriers, lessons learned on how the technology can improve City operations

Roles & Responsibilities:

	Internal	External
Executive Champion	Tomika Monterville (Transportation Director) Razi Hosseini (Public Works)	Walt Downing (SwRI)
Lead Facilitator	Rhia Pape (Innovation)	Technical Project Manager: Dan Rossiter (SwRI)
Investigator(s)	Marc Jacobson (Public Works Dept) & Greg Reininger (Transportation Dept)	Will Maney (USAA); Charlotte Creech (USAA)
Technical	ITSD	ITSD: Derek Rabey; Carlos Lara; John Rodriquez SwRI: Kyle Widmann, Sabrina Mosher, Edward Vear UTSA: Data science Fellows (2)
Report	TBD	TBD

Estimated Timeline: *Reflects phase 1

- a. March-July 2021: Scoping
- b. July-August 2021: Accessing camera and data collection
- c. September- December 2021: Data Cleaning, Data Validation
- d. January- May 2022: Analysis, Adjust Machine Learning Algorithms, Reliability Assessment

- e. June- August 2022: Collecting Results and Reporting

Anticipated Results:

- a. Stakeholders will gain a better understanding the issues that lead to traffic accidents
- b. Outcomes will empower stakeholders to plan smarter, safer streets and pedestrian features
- c. Sufficient data will be available to replace existing stand-alone roadway data collection efforts to save taxpayer dollars
- d. Vision Zero can use the data from this project to make informed decisions and proactively determine the allocation of resources and ensure equitable and targeted improvements